

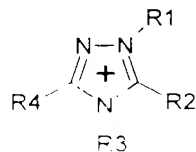
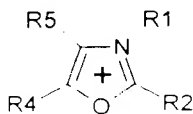
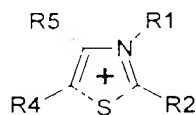
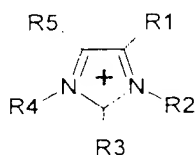
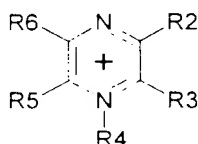
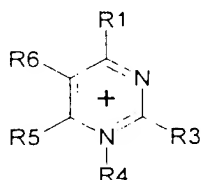
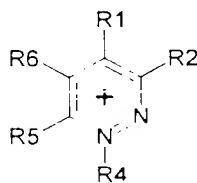
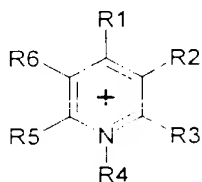
Claims

1. An ionic liquid of the general formula



wherein:

K^+ is a cation selected from:



wherein

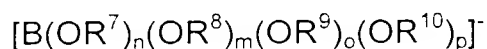
R^1 to R^6 are identical or different and are each individually

- H ,

partially or fully substituted by F , Cl , $N(C_2F_5)_{2-x}H_x$, $O(C_2F_5)_{2-x}H_x$, $SO_2(C_2F_5)_{2-x}H_x$ or C_2F_5 , wherein $1 < n < 6$ and $0 < x < 13$

- a phenyl radical which is unsubstituted or which is partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$
- 5 - one or more pairs of adjacent R^1 to R^6 can also be an alkylene or alkenylene radical and having up to 8 C atoms, wherein the radical is unsubstituted or partially or fully substituted by halogen, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$

10 wherein A^- is an anion selected from



wherein

15 $0 \leq n, m, o, p \leq 4$, and $m+n+o+p=4$, and

R^7 to R^{10} are different or identical and are each, individually:

20 an aromatic ring selected from a phenyl, naphthyl, anthracenyl and phenanthrenyl ring, which is unsubstituted, or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or halogen,

25 an aromatic heterocyclic ring selected from a pyridyl, pyrazyl and pyrimidyl ring, which is unsubstituted, or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or halogen, or

30 an alkyl radical (C_1 to C_8), which is unsubstituted, or which is partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$, or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$

and wherein one or more pairs of R^7 to R^{10} can also form

35 anthracenyliene and phenanthrenyliene ring, which is unsubstituted or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or halogen

an aromatic heterocyclic ring selected from a pyridylene, pyrazylene and pyrimidylene ring, which is unsubstituted, or which is mono-substituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or halogen, or

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an alkylene or alkenylene radical having up to 8 C atoms and which is unsubstituted or which is partially or fully substituted by halogen, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$

10

or OR^7 to OR^{10} ,

individually or together, are an aromatic having 6 to 14 C atoms or are aliphatic having 1 to 6 C atoms and which is a carboxyl, dicarboxyl, oxysulfonyl or oxycarbonyl radical, which is unsubstituted, or which is partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$.

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2. An ionic liquid according to claim 1, wherein at least one of R^1 to R^6 of the cation is an alkyl radical which is unsubstituted or partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$

25

3. An ionic liquid according to claim 1, wherein at least one of R^1 to R^6 of the cation is a phenyl radical which is unsubstituted or partially or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$.

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4. An ionic liquid according to claim 1, wherein at least a pair of R^1 to R^6 of the cation is an alkylene or alkenylene radical which is unsubstituted or partially or fully substituted by halogen, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$

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5. An ionic liquid according to claim 1, wherein at least one of R^1 to R^6 of the anion is an alkyl radical which is unsubstituted or partially

or fully substituted by F, Cl, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$, or $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$.

5 6. An ionic liquid according to claim 1, wherein at least one pair of R^7 to R^{10} of the anion is an alkylene or alkenylene radical which is unsubstituted or partially or fully substituted by a halogen, $N(C_nF_{(2n+1-x)}H_x)_2$, $O(C_nF_{(2n+1-x)}H_x)$, $SO_2(C_nF_{(2n+1-x)}H_x)$ or $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$.

10 7. An ionic liquid according to claim 1, wherein at least one of R^7 to R^{10} of the anion is an aromatic ring selected from a phenyl, naphthyl, anthracenyl and phenanthrenyl ring, which is unsubstituted, or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or by a halogen.

15 8. An ionic liquid according to claim 1, wherein at least one of R^7 to R^{10} of the anion is an aromatic heterocyclic ring selected from a pyridyl, pyrazyl and pyrimidyl ring, which is unsubstituted, or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or by a halogen (F, Cl or Br).

20 9. An ionic liquid according to claim 1, wherein at least one pair of R^7 to R^{10} of the anion is an aromatic ring selected from a phenylene, naphthylene, anthracenylene and phenanthrenylene ring, which is unsubstituted or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$, wherein $1 < n < 6$ and $0 < x \leq 13$, or halogen.

25 10. An ionic liquid according to claim 1, wherein at least one pair of R^7 to R^{10} of the anion is an aromatic heterocyclic ring selected from a pyridylene, pyrazylene and pyrimidylene ring, which is unsubstituted, or which is monosubstituted or polysubstituted by $C_nF_{(2n+1-x)}H_x$ wherein $1 < n < 6$ and $0 < x \leq 13$, or by halogen.

30 11. An electrochemical cell comprising:

12. A supercapacitor comprised of at least a pair of electrodes, a separator, and the ionic liquid of claim 1.

13. An electrolyte composition comprising an ionic liquid of claim 1 and an aprotic solvent.

14. An electrolyte composition comprising an ionic liquid of claim 1 and a conductive salt.

15. A method for making an ionic liquid according to claim 1, comprising reacting a chloride salt of the formula K^+Cl^- with a lithium salt of the formula Li^+A^- within an aprotic solvent.